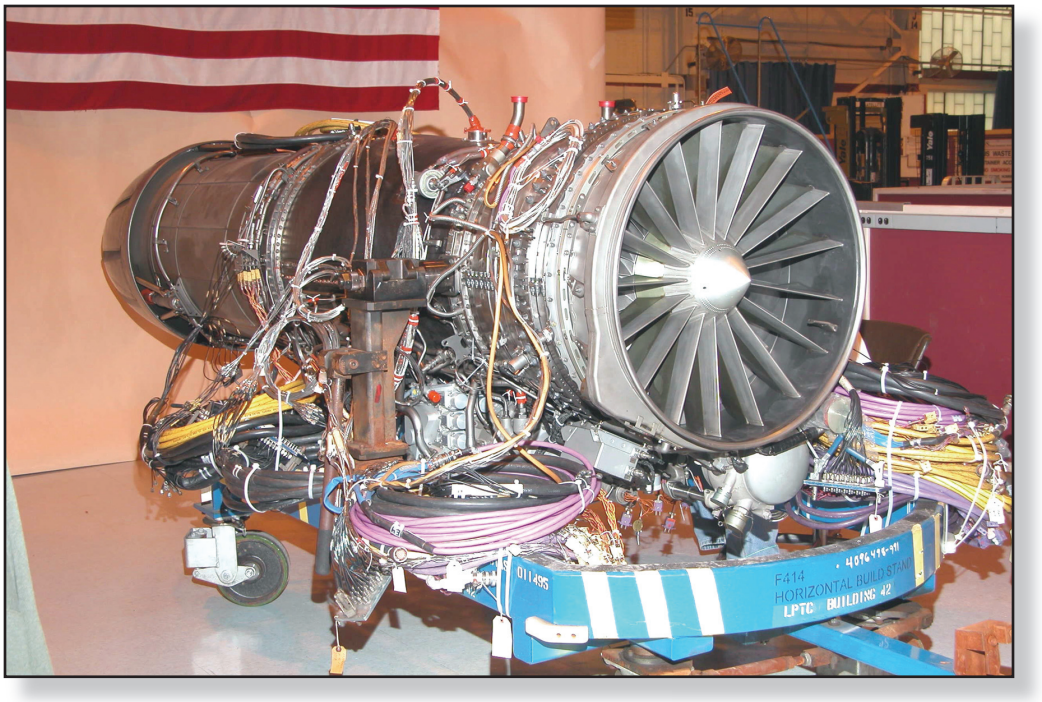
Air Force Research Laboratory|AFRL

Science and Technology for Tomorrow's Air and Space Force

Success Story

STRUCTURAL TURBINE ENGINE DEMONSTRATOR COMPLETES MAJOR TEST MILESTONE



The joint Air Force/Navy XTE77/SE1 demonstrator engine successfully completed high-cycle fatigue (HCF) model validation testing at the General Electric test facility in Lynn, Massachusetts. The results of the AFRL Propulsion Directorate's engine demonstrator test will have a direct effect on lowering the risk associated with HCF in advanced engine development efforts such as the Joint Strike Fighter's F136 engine.

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Accomplishment

HCF is a phenomenon associated with turbine engine operation that produces vibratory stress cycles induced from various electromechanical sources. HCF has historically led to premature failure of major turbine engine components. The XTE77/SE1 demonstrator engine is based on the F414 design, utilizing advanced technologies such as a forward-swept second-stage fan, low-excitation front frame, six-stage three-dimensional aerodynamic compressor, and high-pressure turbine with single-crystal MX4 blades.

Data derived from testing this highly instrumented engine will be used to validate key elements of the HCF test protocol developed under AFRL's Integrated High-Performance Turbine Engine Technology (IHPTET) program. The demonstrator completed 59 hours, 39 minutes of the test run. Post-test borescopic inspection of the hot section found it to be in excellent condition.

Background

The primary goal of the IHPTET program is to advance military aircraft superiority through high-performance, affordable, robust turbine engine designs. The IHPTET program has an aggressive technology plan to leapfrog technical barriers and deliver twice the propulsion capability of today's turbine engine systems. Unprecedented teaming by the Army, Navy, Air Force, National Aeronautics and Space Administration, Defense Advanced Research Projects Agency, and industry is taking place in each of the program's major technology focus areas.

Propulsion
Emerging Technologies

Additional Information

To receive more information about this or other activities in the Air Force Research Laboratory, contact TECH CONNECT, AFRL/XPTC, (800) 203-6451 and you will be directed to the appropriate laboratory expert. (04-PR-26)